

## Improving Sanitation and Health in Rural Alaska

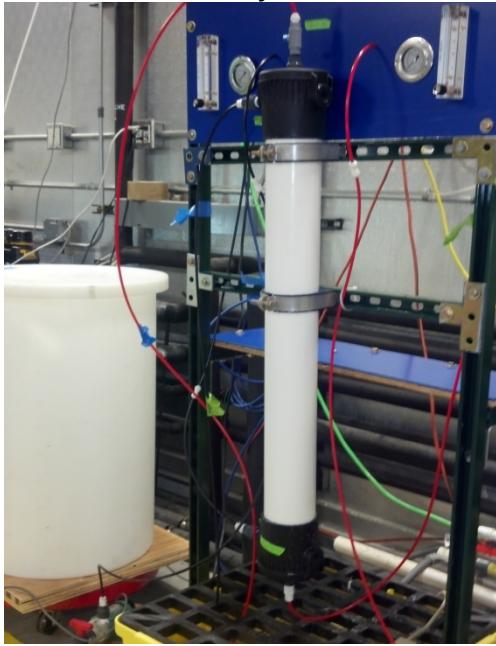
In rural Alaskan communities personal health is threatened by energy costs and limited access to clean water, wastewater management, and adequate nutrition. Fuel-based energy systems are significant factors in determining local accessibility to clean water, sanitation and food. Increasing fuel costs induce a scarcity of access and impact residents' health. The University of Alaska Fairbanks (UAF) School of Natural Resources and Agricultural Sciences (SNRAS), NASA's Ames Research Center, and USDA Agricultural Research Service (ARS) have joined forces to develop high-efficiency, low-energy consuming techniques for water treatment and food production in rural circumpolar communities. Methods intended for exploration of space and establishment of settlements on the Moon or Mars will ultimately benefit Earth's communities in the circumpolar north.

The initial phase of collaboration is completed. Researchers from NASA Ames Research Center and SNRAS, funded by the USDA-ARS, tested a simple, reliable, low-energy sewage treatment system to recycle wastewater for use in food production and other reuse options in communities. The system extracted up to 70% of the water from sewage and rejected up to 92% of ions in the sewage with no carryover of toxic effects. Biological testing showed that plant growth using recovered water in the nutrient solution was equivalent to that using high-purity distilled water.

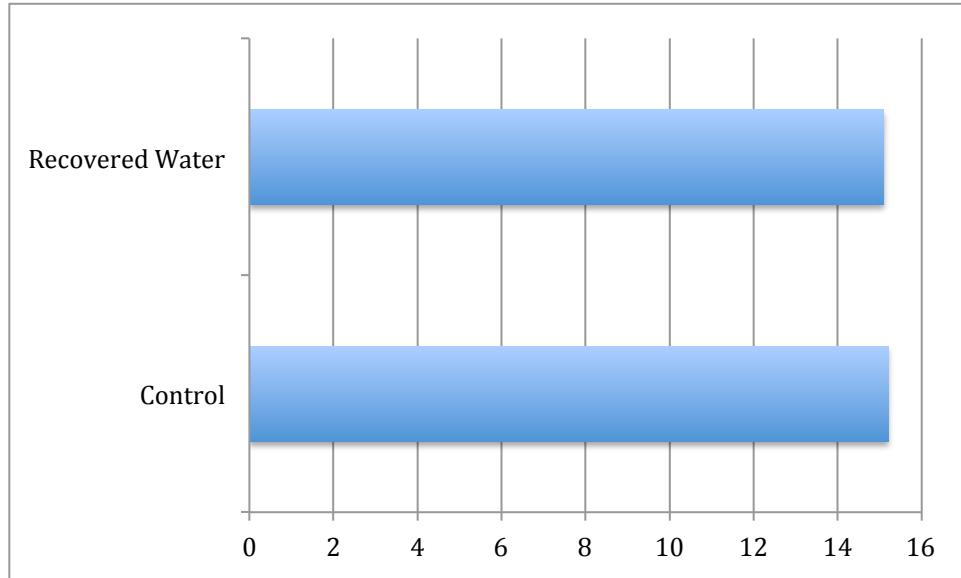
With successful demonstration that the low energy consuming wastewater treatment system can provide safe water for communities and food production, the team is ready to move forward to a full-scale production testbed. The SNRAS/NASA team (including Alaska students) will design a prototype to match water processing rates and food production to meet rural community sanitation needs and nutritional preferences. This system would be operated in Fairbanks at the University of Alaska through SNRAS. Long-term performance will be validated and operational needs of the system determined. The testbed will be a part of the university education and operator training program.

The "Forgotten Alaska" has long awaited this technology to augment the traditional subsistence network and maintain healthy living in the circumpolar north.

## Water Treatment System



Plant Growth Results with Nutrient Solution Made With Recovered Water from Sewage Treatment Compared with Control Solution Made with Pure Water.



Crop Production Chamber

